AMENDMENTS TO THE CLAIMS

Pursuant to 37 C.F.R. § 1.121 the following listing of claims will replace all prior versions, and listings, of claims in the application.

Claims 1-66 (Cancelled)

Claim 67 (Previously Presented): A decoder for producing a synthesized wideband signal, comprising:

a) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients;

b) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector;

c) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector;

d) a combiner circuit for combining said pitch codevector and said innovative codevector to thereby produce an excitation signal;

e) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal; and

f) a high-frequency content recovering device comprising:

i) a random noise generator for producing a noise sequence having a given spectrum;

ii) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal; and

iii) a signal injection circuit for injecting said spectrally-shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

Claim 68 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 67, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 69 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 68 [[8]], wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 70 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 69, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 71 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 70, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~rv using the relation :~~

$$~~rv = (Ev - Ec) / (Ev + Ec)~~$$

~~where Ev is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~Ec is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 72 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 70, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

$$~~\text{Energy scaling factor} = \frac{\sqrt{\sum_{n=0}^{N-1} u'^2(n)}}{\sqrt{\sum_{n=0}^{N-1} w'^2(n)}}, n = 0, \ldots, N'-1,~~$$

~~where w' is said~~ in relation to the white noise sequence~~, u' is~~ and an enhanced excitation signal derived from said excitation signal~~, N' is a length of the white noise sequence and N is a subframe length~~.

Claim 73 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 70, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor ~~gt using the relation :~~

$$~~gt = 1 - tilt \quad \text{bounded by } 0.2 \leq gt \leq 1.0~~$$

~~where tilt is a tilt factor given by :~~

$$\text{~~tilt~~} = \frac{\sum_{n=1}^{N-1} s_h(n)s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$

~~conditioned by tilt ≥ 0 et tilt ≥ rv,~~

~~wherein Sh is~~ in relation to the synthesized signal~~, rv is~~ and the voicing factor~~, N is a subframe length and n=0,...N-1~~.

Claim 74 (Cancelled):

Claim 75 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 69, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2 kHz.

Claim 76 (Previously Presented): A decoder for producing a synthesized wideband signal, comprising:

a) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients;

b) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector;

c) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector;

d) a combiner circuit for combining said pitch codevector and said innovative codevector to thereby produce an excitation signal; and

e) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized

wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal;

the improvement a high-frequency content recovering device comprising:

i) a random noise generator for producing a noise sequence having a given spectrum;

ii) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal; and

iii) a signal injection circuit for injecting said spectrally-shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

Claim 77 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 76, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 78 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 77, wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 79 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 78, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 80 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 79, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~rv using the relation :~~

~~$$rv = (Ev - Ec) / (Ev + Ec)$$~~

~~where Ev is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~Ec is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 81 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 79, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

~~$$\text{Energy scaling factor} = \frac{\sqrt{\sum_{n=0}^{N-1} u'^2(n)}}{\sqrt{\sum_{n=0}^{N-1} w'^2(n)}}, n = 0, \ldots, N'-1,$$~~

~~where w' is said~~ in relation to the white noise sequence ~~, u' is~~ and an enhanced excitation signal derived from said excitation signal~~, N' is a length of the white noise sequence and N is a subframe length~~.

Claim 82 (Currently Amended): A decoder for producing a synthesized wideband signal as defined in claim 79, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor ~~gt using the relation :~~

~~$gt = 1 - tilt$ bounded by $0.2 \leq gt \leq 1.0$~~

~~where tilt is a tilt factor given by :~~

$$\text{~~tilt~~} = \frac{\sum_{n=1}^{N-1} s_h(n)s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$

~~conditioned by tilt ≥ 0 et tilt $\geq rv$,~~

~~wherein Sh is~~ in relation to the synthesized signal~~, r_v is~~ and the voicing factor~~, N is a subframe length and n=0,...N-1~~.

Claim 83 (Cancelled):

Claim 84 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 78, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2 kHz.

Claim 85 (Previously Presented): A cellular communication system for servicing a geographical area divided into a plurality of cells, comprising:

a) mobile transmitter/receiver units;

b) cellular base stations respectively situated in said cells;

c) a control terminal for controlling communication between the cellular base stations;

d) a bidirectional wireless communication sub-system between each mobile unit situated in one cell and the cellular base station of said one cell, said bidirectional wireless communication subsystem comprising, in both the mobile unit and the cellular base station:

i) a transmitter including an encoder for encoding a wideband signal and a transmission circuit for transmitting the encoded wideband signal; and

ii) a receiver including a receiving circuit for receiving a transmitted encoded wideband signal and a decoder for decoding the received encoded wideband signal, said decoder comprising:

(1) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients;

(2) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector;

(3) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector;

(4) a combiner circuit for combining said pitch codevector and said innovative codevector to thereby produce an excitation signal;

(5) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal; and

(6) a high-frequency content recovering device comprising:

a) a random noise generator for producing a noise sequence having a given spectrum;

b) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal; and

c) a signal injection circuit for injecting said spectrally-shaped noise

sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

Claim 86 (Previously Presented): A cellular communication system as defined in claim 85, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 87 (Previously Presented): A cellular communication system as defined in claim 86, wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 88 (Currently Amended): A cellular communication system as defined in claim 87, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 89 (Currently Amended): A cellular communication system as defined in claim 88, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~rv using the relation :~~

$$~~rv = (Ev - Ec) / (Ev + Ec)~~$$

~~where Ev is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~Ec is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 90 (Currently Amended): A cellular communication system as defined in claim 88, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

$$~~\textit{Energy scaling factor} = \sqrt{\frac{\sum_{n=0}^{N-1} u'^2(n)}{\sum_{n=0}^{N'-1} w'^2(n)}}, n = 0, \ldots, N'-1,~~$$

~~where w' is said~~ in relation to the white noise sequence~~, u' is~~ and an enhanced excitation signal derived from said excitation signal~~, N' is a length of the white noise sequence and N is a subframe length~~.

Claim 91 (Currently Amended): A cellular communication system as defined in claim 88, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor g_t ~~using the relation :~~

$$~~g_t = 1 - tilt \quad \text{bounded by } 0.2 \leq g_t \leq 1.0~~$$

~~where *tilt* is a tilt factor given by :~~

$$\text{~~tilt~~} = \frac{\sum_{n=1}^{N-1} s_h(n)s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$

~~conditioned by *tilt* ≥ 0 et *tilt* ≥ r_v;~~

~~wherein S_h is~~ in relation to the synthesized signal~~, r_v is~~ and the voicing factor, N is a subframe length and n=0,...N-1.

Claim 92 (Cancelled):

Claim 93 (Previously Presented): A cellular communication system as defined in claim 87, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2 kHz.

Claim 94 (Previously Presented): A mobile transmitter/receiver unit comprising:

a receiver including a receiving circuit for receiving a transmitted encoded wideband signal and a decoder for decoding the received encoded wideband signal, said decoder comprising:

i) a signal fragmenting device for receiving an encoded version of a wideband signal previously down-sampled during encoding and extracting from said encoded wideband signal version at least pitch codebook parameters, innovative codebook parameters, and linear prediction filter coefficients;

ii) a pitch codebook responsive to said pitch codebook parameters for producing a pitch codevector;

iii) an innovative codebook responsive to said innovative codebook parameters for producing an innovative codevector;

iv) a combiner circuit for combining said pitch codevector and said innovative codevector to thereby produce an excitation signal;

v) a signal synthesis device including a linear prediction filter for filtering said excitation signal in relation to said linear prediction filter coefficients to thereby produce a synthesized wideband signal, and an oversampler responsive to said synthesized wideband signal for producing an over-sampled signal version of the synthesized wideband signal; and

vi) a high-frequency content recovering device comprising:

(1) a random noise generator for producing a noise sequence having a given spectrum;

(2) a spectral shaping unit for shaping the spectrum of the noise sequence in relation to linear prediction filter coefficients related to said down-sampled wideband signal; and

(3) a signal injection circuit for injecting said spectrally-shaped noise sequence in said over-sampled synthesized signal version to thereby produce said full-spectrum synthesized wideband signal.

Claim 95 (Previously Presented): A mobile transmitter/receiver unit as defined in claim 94, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 96 (Previously Presented): A mobile transmitter/receiver unit as defined in claim 95, wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 97 (Currently Amended): A mobile transmitter/receiver unit as defined in claim 96, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 98 (Currently Amended): A mobile transmitter/receiver unit as defined in claim 97, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~r_v using the relation :~~

$$~~r_v = (E_v - E_e) / (E_v + E_e)~~$$

~~where E_v is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~E_e is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 99 (Currently Amended): A mobile transmitter/receiver unit as defined in claim 97, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

$$\text{Energy scaling factor} = \frac{\sqrt{\sum_{n=0}^{N-1} u'^2(n)}}{\sqrt{\sum_{n=0}^{N-1} w'^2(n)}}, \quad n = 0, \ldots, N'-1,$$

where w' is said in relation to the white noise sequence, u' is and an enhanced excitation signal derived from said excitation signal, N' is a length of the white noise sequence and N is a subframe length.

Claim 100 (Currently Amended): A mobile transmitter/receiver unit as defined in claim 97, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor g_t using the relation :

$$g_t = 1 - tilt \quad \text{bounded by } 0.2 \leq g_t \leq 1.0$$

where *tilt* is a tilt factor given by :

$$tilt = \frac{\sum_{n=1}^{N-1} s_h(n) s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$

conditioned by $tilt \geq 0$ et $tilt \geq r_v$;

wherein S_h is in relation to the synthesized signal, r_v is and the voicing factor, N is a subframe length and $n=0,\ldots N-1$.

Claim 101 (Cancelled):

Claim 102 (Previously Presented): A mobile transmitter/receiver unit as defined in claim 96, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2

kHz.

Claim 103 (Previously Presented): A communication network element comprising:

a receiver including a receiving circuit for receiving a transmitted encoded wideband signal and a decoder as recited in claim 67 for decoding the received encoded wideband signal.

Claim 104 (Previously Presented): A communication network element as defined in claim 103, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 105 (Previously Presented): A communication network element as defined in claim 104, wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 106 (Currently Amended): A communication network element as defined in claim 105, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 107 (Currently Amended): A communication network element as defined in claim 106, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~r_v using the relation :~~

$$r_v = (E_v - E_e) / (E_v + E_e)$$

~~where E_v is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~E_e is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 108 (Currently Amended): A communication network element as defined in claim 106, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

$$\text{Energy scaling factor} = \frac{\sqrt{\sum_{n=0}^{N-1} u'^2(n)}}{\sqrt{\sum_{n=0}^{N-1} w'^2(n)}}, n = 0, \ldots, N' - 1,$$

~~where w' is said~~ the white noise sequence~~, u' is~~ and an enhanced excitation signal derived from said excitation signal~~, N' is a length of the white noise sequence and N is a subframe length~~.

Claim 109 (Currently Amended): A communication network element as defined in claim 106, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor ~~g_t using the relation :~~

~~$$g_t = 1 - tilt \qquad \text{bounded by } 0.2 \leq g_t \leq 1.0$$~~

~~where *tilt* is a tilt factor given by :~~

~~$$tilt = \frac{\sum_{n=1}^{N-1} s_h(n) s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$~~

~~conditioned by $tilt \geq 0$ et $tilt \geq r_v$;~~

~~wherein S_h is~~ in relation to the synthesized signal~~, r_v is~~ and the voicing factor~~, N is a subframe length and $n=0,\ldots N-1$~~.

Claim 110 (Cancelled):

Claim 111 (Previously Presented): A communication network element as defined in claim 105, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2 kHz.

Claim 112 (Previously Presented): In a cellular communication system for servicing a geographical area divided into a plurality of cells, comprising: mobile transmitter/receiver units; cellular base stations, respectively situated in said cells; and a control terminal for controlling communication between the cellular base stations:

a bidirectional wireless communication sub-system between each mobile unit situated in one cell and the cellular base station of said one cell, said bidirectional wireless communication sub-system comprising, in both the mobile unit and the cellular base station:

a) a transmitter including an encoder for encoding a wideband signal and a transmission circuit for transmitting the encoded wideband signal; and

b) a receiver including a receiving circuit for receiving a transmitted encoded wideband signal and a decoder as recited in claim 67 for decoding the received encoded wideband signal.

Claim 113 (Previously Presented): A bidirectional wireless communication sub-system as defined in claim 112, wherein said random noise generator comprises a random white noise generator for producing a white noise sequence whereby said spectral shaping unit produces a spectrally-shaped white noise sequence.

Claim 114 (Previously Presented): A bidirectional wireless communication sub-system as defined in claim 113, wherein said spectral shaping unit comprises:

a) a gain adjustment module, responsive to said white noise sequence and a set of gain adjusting parameters, for producing a scaled white noise sequence;

b) a spectral shaper for filtering said scaled white noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered scaled white noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of said over-sampled synthesized signal version; and

c) a band-pass filter responsive to said filtered scaled white noise sequence for producing a band-pass filtered scaled white noise sequence to be subsequently injected in said over-sampled synthesized signal version as said spectrally-shaped white noise sequence.

Claim 115 (Currently Amended): A bidirectional wireless communication sub-system as defined in claim 114, further comprising:

a) a voicing factor generator responsive to said ~~adaptive~~ pitch and innovative codevectors for calculating a voicing factor for forwarding to said gain adjustment module;

b) an energy computing module responsive to said excitation signal for calculating an excitation energy for forwarding to said gain adjustment module; and

c) a spectral tilt calculator responsive to said synthesized signal for calculating a tilt scaling factor for forwarding to said gain adjustment module;

wherein said set of gain adjusting parameters comprises said voicing factor, said excitation energy, and said tilt scaling factor.

Claim 116 (Currently Amended): A bidirectional wireless communication sub-system as defined in claim 115, wherein said voicing factor generator comprises a means for calculating said voicing factor ~~r_v using the relation :~~

$$~~r_v = (E_v - E_e) / (E_v + E_e)~~$$

~~where E_v is the~~ in relation to an energy of a gain-scaled version of the pitch codevector and ~~E_e is the~~ an energy of a gain-scaled version of the innovative codevector.

Claim 117 (Currently Amended): A bidirectional wireless communication sub-system as defined in claim 115, wherein said gain adjustment module comprises a means for calculating an energy scaling factor ~~using the relation:~~

$$~~\text{Energy scaling factor} = \frac{\sqrt{\sum_{n=0}^{N-1} u'^2(n)}}{\sqrt{\sum_{n=0}^{N'-1} w'^2(n)}}, n = 0, \ldots, N'-1,~~$$

~~where w' is said~~ in relation to the white noise sequence~~, u' is~~ and an enhanced excitation signal derived from said excitation signal~~, N' is a length of the white noise sequence and N is a subframe length~~.

Claim 118 (Currently Amended): A bidirectional wireless communication sub-system as defined in claim 115, wherein said spectral tilt calculator comprises a means for calculating said tilt scaling factor g_t ~~using the relation :~~

~~$g_t = 1 - tilt$ bounded by $0.2 \leq g_t \leq 1.0$~~

~~where *tilt* is a tilt factor given by :~~

$$\text{~~tilt~~} = \frac{\sum_{n=1}^{N-1} s_h(n) s_h(n-1)}{\sum_{n=0}^{N-1} s_h^2(n)}$$

~~conditioned by $tilt \geq 0$ et $tilt \geq r_v$;~~

~~wherein S_h is~~ in relation to the synthesized signal~~, r_v is~~ and the voicing factor, ~~N is a subframe length and $n=0,\ldots N-1$~~.

Claim 119 (Cancelled):

Claim 120 (Previously Presented): A bidirectional wireless communication sub-system as defined in claim 114, wherein said band-pass filter comprises a frequency bandwidth located between 5.6 kHz and 7.2 kHz.

Claim 121 (Cancelled):

Claim 122 (Previously Presented): A high-frequency content recovering method as defined in claim 64, wherein said spectral shaping of the noise sequence comprises filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.

Claim 123 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 67, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.

Claim 124 (Previously Presented): A decoder for producing a synthesized wideband signal as defined in claim 76, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.

Claim 125 (Previously Presented): A cellular communication system as defined in claim 85, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.

Claim 126 (Previously Presented): A mobile transmitter/receiver unit as defined in claim 94, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.

Claim 127 (Previously Presented): A network element as defined in claim 103, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of

the over-sampled synthesized signal version.

Claim 128 (Previously Presented): A bidirectional wireless communication sub-system as defined in claim 112, wherein said spectral shaping unit comprises a spectral shaper for filtering the noise sequence in relation to a bandwidth expanded version of the linear prediction filter coefficients to produce a filtered noise sequence characterized by a frequency bandwidth generally higher than a frequency bandwidth of the over-sampled synthesized signal version.